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Claims

A device (200, 300) for patterning structures (207, 307) on a substrate (201, 301) comprising:

an Atomic Force Microscope (202, 302) having a scanning tip (203, 303);

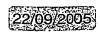
a light emitting device (204, 304), and

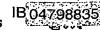
a space around the scanning tip, which space comprises a vapour of a material which is suitable for Chemical Vapour Deposition onto the substrate (201, 301) when decomposed,

wherein the light emitting device (204, 304) is adapted to emit a light beam (206, 306), which light beam has an intensity that is not capable to decompose the vapour, onto the tip (203, 303) in such a way that an electromagnetic field induced by the light beam (206, 306) near the tip (203, 303) is high enough to decompose the vapour.

- 2. The device according claim 1, wherein the light emitting device (204, 304) is a laser.
- 3. The device according claim 1 or 2, wherein the laser device (204, 304) is adapted to emit the light beam (206, 306) onto the tip (203, 303) in such a way that the polarization is parallel to a longitudinal axis of the tip (203, 303).
- 4. The device according to anyone of the claims 1 to 3, wherein the tip (203, 303) has a dimension between 5 nm and 20 nm.
- 5. The device according to anyone of the claims 1 to 4, wherein the device comprises a plurality of substantially parallel tips (303a, 303b, 303c, 303d).







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- 6. The device according to anyone of the claims 1 to 5, wherein the wavelength of the light beam (206, 306) is adapted to match the size of the tip (203, 303) so that a sufficient amplification of the emitted light beam is achieved.
- 7. The device according to anyone of the claims 1 to 6, wherein one or more of the tips (203, 303a, 303b, 303c, 303d) are metalized.
- 8. The device according to anyone of the claims 1 to 6, wherein the vapour is a gas out of a group of gases comprising Halides, Hydrides, and Metal Organic Compounds.
- 9. The device according to anyone of the claims 1 to 8, wherein the vapour is a gas out of a group of gases comprising AuClPF₃, W(CO)₅, TiCl₄, TaCl₅, WF₅, SiH₄, GeH₄, AlH₃(NMe₃)₂, NH₃, AlMe₃, Ti(CH₂tBu)₄, Ti(OiPr)₄, Ti(NMe₂)₄, Cu(acac)₂, and Ni(CO)₄.
- 10. A method for patterning structures (207, 307) on a substrate (201, 301) by a device including an Atomic Force Microscope (202, 302) and a light emitting device (204, 304), the method comprising the steps of:

providing the substrate (201, 301) underneath a tip (203, 303) of the Atomic Force Microscope (202, 302);

providing a vapour of a material, which is suitable for Chemical Vapour Deposition onto the substrate (201, 301) when decomposed, in a space between the tip (203, 303) and the substrate (201, 301); and

exposing the tip (203, 303) to a light beam (206, 306) emitted by the light emitting device (204, 304), wherein an intensity of the light beam (206, 306) is not enough to decompose the vapour, in such a way that the tip (203, 303) intensifies the electromagnetic near-field to an extend that the vapour is decomposed.



